C++ PROGRAMMING APPLICATIONS

This course is designed to develop object-oriented programming language skills using C++. The student will utilize the commands, statements, and procedures of this language to write, run, debug, and edit computer programs.

Prerequisites: Keyboarding

Prerequisites or Concurrent with: Algebra I

Recommended Prerequisites or Concurrent with: Computer Applications, Word Processing Essentials, Career Connection

Grades: 9, 10, 11, 12

Recommended Credit: 1 Credit

Standard 1.0

The student will demonstrate proficiency in the background knowledge of computers and programming.

Standard 2.0

The student will research and apply knowledge of ethical and legal issues within the industry.

Standard 3.0

The students will use Program Development Tools as they relate to the programming development cycle. (Alg I 1.0, 3.0, 5.0).

Standard 4.0

The student will apply system operations in executing C++ programs.

Standard 5.0

The student will write and document an executable program in C++ Programming Language.

Standard 6.0*

The student will work as a team member to develop an integrated application using C++ Programming Language.

Standard 7.0

The student will apply concepts and guidelines for typography, design, layout, and composition in developing a computer program.

Standard 8.0

The student will develop and demonstrate human relations, self-management, organizational, and professional leadership skills.

Course Description:

This course is designed to develop object-oriented programming language skills using C++. The student will utilize the commands, statements, and procedures of this language to write, run, debug, and edit computer programs. (This course requires a computerized workstation for each student with appropriate text editing and compiler software and tools provided.)

Standard 1.0

The student will demonstrate proficiency in the background knowledge of computers and programming.

Learning Expectations

The student will:

1.1 Discuss the history of computers and programming languages.
1.2 Discuss the components of the computer.
1.3 Summarize the characteristics of the C++ Programming Language.
1.4 Critique the role of computer programming in society.

Student Performance Indicator: Evidence Standard Is Met

The student:

- Summarizes the history of computers and programming languages.
- Explains the purposes of the C++ Programming Language.
- Examines the role of computer programming in society.

Sample Performance Task

The student will develop a timeline for the history of computers and programming languages. Proficiency would be evaluated by the given dates and the content area covered on the timeline.

Integration/Linkages

Algebra I Standards 1.0, 3.0, English II Standard 3.0, All subject areas, SCANS, National Standards for Business Education, National Science Education Standards, National Math Standards, National Educational Technology Standards (NETS), Data Processing Management Association, Policies Commission for Business and Economic Education

C++ Programming Applications

Standard 2.0

The student will research and apply knowledge of ethical and legal issues within the industry.

Learning Expectations

The student will:

2.1 Demonstrate work ethics that include integrity, honesty, and perseverance to be accepted by industry.
2.2 Research benefits and consequences resulting from the practice of business ethics.
2.3 Comprehend copyright laws and their applications to text, visual art, design, and photography.
2.4 Research legal responsibilities associated with the use of the Internet as required by federal and state government agencies.

Student Performance Indicators: Evidence Standard Is Met

The student:
- Applies ethical conduct providing the proper credit to those whose ideas and content has been used in creating new works.
- Demonstrates ethical behaviors in what is written, spoken, or presented in designing and presenting a multimedia project.
- Applies knowledge of copyrights in seeking formal permission from copyright sources before using materials.
- Recognizes the legal implications of violating federal and state laws in multimedia/digital publishing.
- Demonstrates legal responsibilities using the Internet for interactive multimedia projects.
- Demonstrate skills necessary for safety and environmental protection in digital design and photography.

Sample Performance Task

Design and produce an interactive multimedia project on legal and ethical issues that includes: issues and penalties for plagiarism, obligations, and procedures related to obtaining permission in copying materials. Provide attribution, determine the need for requesting permission to reproduce materials and obtain formal permission for use of materials where needed (quotations, art form, design, photo, text from a book, text from the Web…). Develop and present a total team interactive multimedia project utilizing various technology components.

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Integration/Linkages

All subject areas, SCANS, National Standards for Business Education, Policy Commission for Business and Economic Education, National Science Education

Standards, National Math Standards, National Language Arts Skills Standards, National Educational Technology Standards (NETS), Data Processing Management Association (DPMA), International Association of Administrative Professionals (IAAP), Gateway Algebra I, and Gateway English II, English IV: Communication for Life

Standard 3.0

The students will use Program Development Tools as they relate to the programming development cycle. (Alg I 1.0, 3.0, 5.0).

Learning Expectations:

The student will:

3.1   Create a storyboard.
3.2   Illustrate a process using a flowchart.
3.3   Demonstrate the use of Pseudocode.
3.4   Develop a detailed logic plan.

Student Performance Indicator: Evidence Standard Is Met

The student:

➕   Diagrams a sequence of steps using program development tools.

Sample Performance Task

The student will produce a detailed logic plan using the programming development tools.

Integration/Linkages

Algebra I Standards 1.0, 3.0, 5.0, English II Standards 1.0, 2.0, 3.0, 4.0, All subject areas, SCANS, National Standards for Business Education, National Science Education Standards, National Math Standards, National Educational Technology Standards (NETS), Data Processing Management Association, Policies Commission for Business and Economic Education

C++ Programming Applications

Standard 4.0

The student will apply system operations in executing C++ programs.

Learning Expectations

The student will:

4.1 Demonstrate computer start-up and shut-down procedures.
4.2 Discuss the execution of programs.
4.3 Explain the storage, retrieval, and deletion of programs.

Student Performance Indicator: Evidence Standard Is Met

The student:

- Demonstrates the use of an existing C++ program on the computer.

Sample Performance Task

The student will demonstrate start-up and execution of an existing program. Evaluation is determined by the successful execution of the programs.

Integration/Linkages

Algebra I Standards 1.0, 3.0, 5.0, English II Standards 1.0, 2.0, 3.0, 4.0, All subject areas, SCANS, National Standards for Business Education, National Science Education Standards, National Math Standards, National Educational Technology Standards (NETS), Data Processing Management Association, Policies Commission for Business and Economic Education

Standard 5.0

> The student will write and document an executable program in C++ Programming Language.

Learning Expectations

The student will:

5.1   Identify names for variables and their data types.
5.2   Recognize and apply the symbols for mathematical operations.
5.3   Demonstrate the various methods of obtaining input/output and formatting output.
5.4   Analyze the task and implement a detailed logic plan.
5.5   Demonstrate the use of control statements.
5.6   Identify, illustrate, and perform operations using arrays.
5.7   Identify and apply virtual functions and polymorphism.
5.8   Read and/or write data files for input/output purposes.
5.9   Debug the program and verify the output of the program.

Student Performance Indicator: Evidence Standard Is Met

> The student:
>
> - Given a task, develop a detailed logic plan that uses appropriate input/output methods, variables, symbols, and appropriate uses.
> - Writes a C++ executable program using control statements, arrays, and functions.
> - Writes input/output data files.
> - Troubleshoots a C++ program.

Sample Performance Task

Each student will write a program that converts data from one unit of measurement to another unit of measurement. Evaluation will be the successful operation of the program.

Integration/Linkages

> Algebra I Standards 1.0, 2.0, 3.0, 4.0, 5.0, English II Standards 1.0, 2.0, 3.0, 4.0, All subject areas, SCANS, National Standards for Business Education, National Science Education Standards, National Math Standards, National Educational Technology Standards (NETS), Data Processing Management Association, Policies Commission for Business and Economic Education

Standard 6.0

The student will work as a team member to develop integrated application using C++ Programming Language.

Learning Expectations

The student team will:

6.1   Define the roles of each team members.
6.2   Solve a complex task using C++ Programming Language.
6.3   Compare and contrast the advantages of working as a group.

Student Performance Indicator: Evidence Standard Is Met

The team:

🔸   Work as a member of team to solve a complex task using C++ Programming Language and presents the solution of the task.

Integration/Linkages

Algebra I Standards 1.0, 3.0, 5.0, English II Standards 1.0, 2.0, 3.0, 4.0, All subject areas, SCANS, National Standards for Business Education, National Science Education Standards, National Math Standards, National Educational Technology Standards (NETS), Data Processing Management Association, Policies Commission for Business and Economic Education

Standard 7.0

The student will apply concepts and guidelines for typography, design, layout, and composition in developing a computer program.

Learning Expectations

The student will:

7.1   Analyze composition processes.
7.2   Illustrate how to apply typographical commands to text.
7.3   Evaluate the effectiveness of typography in publications.
7.4   Compare and contrast the typography from at least two print sources.

Performance Standards: Evidence Standard is Met

The student:

🔸   Applies composition techniques.
🔸   Analyzes different typestyles.
🔸   Differentiates among the different types of justification.
🔸   Prepares a layout using typesetting specifications.

Sample Performance Task

Have students illustrate at least three font technologies. Using different backgrounds compare and contrast the typography of each.

Integration/Linkages

All subject areas, SCANS, National Standards for Business Education, Policy Commission for Business and Economic Education, National Science Education Standards, National Math Standards, National Language Arts Skills Standards, National Educational Technology Standards (NETS), Data Processing Management Association (DPMA), International Association of Administrative Professionals (IAAP), Gateway Algebra I, Gateway English II

Standard 8.0

The student will develop and demonstrate human relations, self-management, organizational, and professional leadership skills.

Learning Expectations

The student will:

8.1 Demonstrate self-initiative through group projects.
8.2 Examine the value of leadership skills.
8.3 Illustrate image building and public relations techniques.
8.4 Assess decision-making skills.
8.5 Demonstrate effective teamwork and group thinking applying conflict resolution techniques.
8.6 Demonstrate parliamentary procedure skills through group activities.
8.7 Demonstrate teamwork skill in developing a C++ program for a specific problem.
8.8 Analyze the goals and apply the principles of a co-curricular student organization.

Student Performance Indicators: Evidence Standard is Met

The student:

- Researches, analyzes, composes, keys, formats and prints the attributes of a leader.
- Applies effective image-building and public relations techniques.
- Designs, writes, runs, debugs, and edits a C++ program to manage chapter activities.
- Organizes and manages a team presentation on leadership.
- Practices proper parliamentary procedure skills through group activities.
- Makes a two-minute report on attributes of a leader.
- Participates in a mock Computer Science, Business Professionals of America and/or Future Business Leaders of America organizational meeting.

Sample Performance Task

Divide the students into groups. Each group will write, run, debug, and edit a program to electronically keep the objectives, financial information, and attendee list for an individual activity for the Computer Science, Business Professionals of America and/or Future Business Leaders of America organization. Each group should develop a different program for each activity such as a community service project, a fundraiser for the scholarship fund, etc. The program should include a general ledger, with sort and print capabilities to produce a balance sheet, income, and expense statements. Remind each group member of his or her responsibilities and role as a group member.

Integration/Linkages

All subject areas, SCANS (The Secretary's Commission on Achieving Necessary Skills), National Standards for Business Education, Policy Commission for Business and Economic Education, National Science Education Standards, National Standards for Business Education, Business Professionals of America Work Place Skills, Future Business Leaders of America National Competencies, Delta Pi Epsilon, National Math Standards, National Language Arts Skills Standards, National Educational Technology Standards, Data Processing Management Association, International Association of Administrative Professionals, Gateway Algebra I, and Gateway English II.